B.E Semester: VIII
Automobile Engineering
Subject Name: Automobile chassis component design (AE801)

Course Objective:

- To present a problem oriented in depth knowledge of automobile chassis component design.
- To address the underlying concepts, methods and application of automobile chassis component design.

Teaching / Examination Scheme:

SUBJECT		Teaching Scheme				Total Credit	Evaluation Scheme					Total Marks
		L	T	P	Total		THEORY		IE	CIA	PR. / VIVA	
CODE	NAME	Hrs	Hrs	Hrs	Hrs		Hrs	Marks	Marks	Marks	Marks	
AE801	Automobile chassis component design	4	0	2	6	5	3	70	30	20	30	150

Detailed Syllabus:

Topic no	Details
1.	**Clutch design:** Design of single plate clutch, multi plate clutch, design of centrifugal clutch, cone clutch, energy dissipated, torque capacity of clutch,
2.	**Gearbox design:** Basic consideration in design, determination of speed range, concept of structure diagram, graphical representation of Ray and speed diagram, gearbox layout.
3.	**Vehicle frame and suspension:** Study of loads, moments and stresses on frame members, closed coil helical springs design, leaf spring design and torsion bar springs, standard size of springs.
4.	**Steering systems design:** Steering linkages, fundamental equation for correct steering, steering mechanism (Davis steering and Ackermann steering mechanism), and turning circle radius.
5.	**Design of Front axle, rear axle and final drive:** Design of propeller shaft, design of front axle, bearing load on front axle, design details of full floating, semi-floating and three quarter floating rear shafts and rear axle housings , design details of final drive gearing,.
6.	**Brake components design:** Energy equation, design of internal expanding brake, design of disk brake, thermal consideration of brake.

Lesson planning:

SR.NO	DATE/WEEK	UNIT NO	%WEIGHTAGE	TOPIC NO
1	1^{st} , 2^{nd} , 3^{rd}	1	20%	1
2	4^{th} ,5^{th} , 6^{th}	2	20%	2
3	7^{th} ,8^{th} , 9^{th}	3	20%	3,4
4	10^{th} ,11^{th} , 12^{th}	4	20%	5
5	13^{th} ,14^{th} , 15^{th}	5	20%	6

Instructional Method & Pedagogy:

- At the start of course, the course delivery pattern , prerequisite of the subject will be discussed
- Lecture may be conducted with the aid of multi-media projector, black board, OHP etc. & equal weightage should be given to all topics while teaching and conduction of all examinations.
- Attendance is compulsory in lectures and laboratory, which may carries five marks in overall evaluation.
- One/Two internal exams may be conducted and total/average/best of the same may be converted to equivalent of 30 marks as a part of internal theory evaluation.
- Assignment based on course content will be given to the student for each unit/topic and will be evaluated at regular interval. It may carry an importance of ten marks in the overall internal evaluation.
- Surprise tests/Quizzes/Seminar/Tutorial may be conducted and having share of five marks in the overall internal evaluation.
- The course includes a laboratory, where students have an opportunity to build an appreciation for the concept being taught in lectures.
- Experiments shall be performed in the laboratory related to course contents. Proposed list of experiments are as follows:
    - Design of cone and semi centrifugal clutch.
    - Design of gear box.
    - Design of leaf and coil spring.
    - Design of steering system.
    - Design of propeller shaft and front and rear axle.
    - Design of internal expanding and disc brake.

  Practical / Oral: The candidate shall be examined on the basis of term-work.

Students Learning Outcomes:

- The student can identify different areas of automobile chassis component design.
- Can find the applications of all the areas in day to day life.

Recommended Demonstrate Materials:

1. Joseph E. Shigley & Larry D. Mitchell, “Mechanical Engineering Design”, Fourth Edition, McGraw-Hill International Book Company
2. “Mechanical system design” by Farazdak haideri
3. “Auto design” by R. B. Gupta

4. Machine Design by R.S.Khurmi & J.K.Gupta, S.Chand & Co
5. Design of machine Elements by Bhandari , Tata McGraw-Hill Publishing Company Ltd
6. Machine Design by Sharma-Agarwal, S.K.Kataria & Sons
7. Machine Design by Sadhusingh, Khanna Publishers,